

REMARKS/ARGUMENTS

Reconsideration of the instant application and favorable action are solicited.

Claims 1-23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Seuter et al. (US 6,951,804B2, hereinafter Seuter). In order to more particularly point out and distinctly claim that which the applicants regard as their invention, independent claims 1 and 11 have been amended. No new matter is introduced by this amendment.

1. 103(a) rejection over Claims 1-23:

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Claims 1-23 were rejected under 35 U.S.C. 103(a), for reason of record that can be found on pages 2-4 in the Office action identified above, which is Part of Paper No./Mail Date 20060626.

Seuter discloses a method of forming a tantalum-nitride layer. Please see col. 4, 15 lines 60-65; col. 6, lines 58-62; col. 6, lines 2-4; Figs. 3a-3c and Fig. 5, Seuter teaches that a pulse of tantalum containing gas is first introduced into the process chamber to form a tantalum layer 305 by chemisorbing a tantalum-containing compound on the wafer surface 300T. Excess tantalum containing compound is then removed from the process chamber by vacuum system. A purge gas may be used to facilitate removal of 20 the excess tantalum-containing compound. After the process chamber has been purged, a pulse of ammonia is introduced into the process chamber and a layer of nitrogen 307 is chemisorbed on the tantalum layer 305. In col. 7, lines 27-29, Seuter teaches that the tantalum and nitrogen containing precursors may be provided simultaneously. Since the tantalum layer 305 is chemisorbed on the wafer surface first and the tantalum layer 305 25 is capped with a layer of chemisorbed nitrogen, a plasma annealing is used to reduce nitrogen content by sputtering off nitrogen, which in turn reduces resistivity (col. 8, lines 23-26).

The applicants believe that the prior art of record neither teach nor make obvious the claimed limitations of the instant application as a whole as recited in claims 1 and 11. The applicants submit that claim 1 contains the patentably distinct limitations of “flowing a nitrogen-containing gas into said CVD chamber, said nitrogen-containing gas
5 being transported to a substrate surface of said substrate and saturatively chemisorbed
onto said substrate surface; shutting down said flow of said nitrogen-containing gas;
thereafter flowing a tantalum-containing organic metal precursor gas into said CVD
chamber through said showerhead with said RF power source being off, wherein said
tantalum-containing organic metal precursor gas reacts with said nitrogen-containing gas
10 that are previously absorbed by said substrate surface; thereby depositing a material film
on said heated substrate”, and that claim 11 contains the patentably distinct limitations of
“flowing a nitrogen-containing gas into said CVD chamber, said nitrogen-containing gas
being transported to a substrate surface of said substrate and saturatively chemisorbed
15 onto said substrate surface; shutting down said flow of said nitrogen-containing gas;
purging said CVD chamber with inert gas; thereafter flowing a tantalum-containing
organic metal precursor gas into said CVD chamber through said showerhead with said
first radio frequency (RF) power source being off, wherein said tantalum-containing
organic metal precursor gas reacts with said nitrogen-containing gas that are previously
absorbed by said substrate surface; thereby depositing a tantalum nitride film on said
20 heated substrate”.

Seuter does not teach or suggest the particular reverse-sequence of forming a tantalum-nitride layer on the wafer surface as recited in claims 1 and 11 of the instant application, including: first introducing nitrogen-containing gas into said CVD chamber,
said nitrogen-containing gas being transported to a substrate surface of said substrate
25 and saturatively chemisorbed onto said substrate surface; then introducing a
tantalum-containing organic metal precursor gas into said CVD chamber through said
showerhead with said RF power source being off. Reconsideration of claims 1 and 11 is

therefore respectfully requested.

As claims 2-10 and 12-23 are dependent upon claims 1 and 11, respectively, they should be allowable if claims 1 and 11 are allowed. Reconsideration of claims 2-10 and 12-23 is therefore politely requested.

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2. New claims 24 and 25:

10 New claims 24 and 25 contains patentably distinct limitations of "said inert gas, said nitrogen-containing gas and said tantalum-containing organic metal precursor gas are flowed into said CVD chamber through said showerhead". The prior art of record neither teach nor make obvious the claimed limitations of the instant application as a whole as recited in claims 24 and 25. Seuter merely teaches that argon gas is introduced through the showhead, while other processing gases are introduced through orifice.

15 Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Appl. No. 10/711,067
Amdt. dated September 27, 2006
Reply to Office action of July 05, 2006

Sincerely yours,



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5 Winston Hsu, Patent Agent No. 41,526
P.O. BOX 506, Merrifield, VA 22116, U.S.A.
Voice Mail: 302-729-1562
Facsimile: 806-498-6673
e-mail : winstonhsu@naipo.com

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